

APPENDIX D - Arden Hills 2040 Comprehensive Water Plan

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EXECUTIVE SUMMARY

Introduction

The City of Arden Hills' Comprehensive Water Supply Plan describes the City's existing water distribution system and water demand, projects future water demand through the year 2040, and proposes infrastructure improvements to meet that demand. This Plan has been prepared according to the guidelines established by the Metropolitan Council and the Minnesota Department of Natural Resources (DNR). The Water Supply Plan immediately following this report follows the template provided by the DNR, while this Comprehensive Water Supply Plan expands upon the template and provides further information for City and Metropolitan Council planning.

Existing System

The City of Arden Hills' water distribution system provides over 300 million gallons of water each year to approximately 2,600 service connections. The City purchases its water from the City of Roseville, which in turn purchases it from Saint Paul Regional Water Services (SPRWS). The treated water received through three service connections along the southern boundary of the City is distributed in two pressure zones, south and north. Each pressure zone has one water tower, and a booster station located beside the South Tower supplies the north pressure zone.

Population and Water Demand

The population of the City of Arden Hills has been growing steadily since 2008. Despite this growth, total water use and per capita water use in the City have been decreasing since 2012. High efficiency appliances, decreased irrigation, general attitudes toward conservation, rainfall and climate likely all play a role in these trends.

Growth and Demand Projections

The Metropolitan Council projects that the City of Arden Hills will continue to develop and grow over the lifetime of this Plan. The population served by the City of Arden Hills' water distribution system is expected to increase to 13,500 people by the year 2040, at which time the projected total per capita water use of 123 gallons per capita per day will result in an average day demand of 2.41 million gallons per day and a maximum day demand of 7.23 million gallons per day.

Proposed Improvements

In addition to regular system maintenance and rehabilitation, the development of the TCAAP site in the north part of the City will require significant improvements to the water supply system. The recommended improvements include the installation of a new booster station, the extension of trunk watermain, and the construction of a new one million gallon water tower.

INTRODUCTION

Purpose

This Comprehensive Water Supply Plan is a section of the City's 2040 Comprehensive Plan. The purpose of the Comprehensive Water Supply Plan is to provide an overview of the City's current drinking water resources, infrastructure, policies, and challenges, and to present future plans.

This Comprehensive Water Supply Plan has been prepared according to the guidelines established by the Metropolitan Council and the Minnesota Department of Natural Resources (DNR) per Minnesota Statute 473.859, which requires that Water Supply Plans be completed by all local units of government in the seven-county Metropolitan Area. The attached Water Supply Plan conforms to the template provided by the DNR, while this Comprehensive Plan expands upon the template and provides further information for City and Metropolitan Council planning.

Background

The City of Arden Hills, ten square miles in area, is located in Ramsey County to the north of the Twin Cities. All of the properties within the City limits are currently serviced by the City's water distribution system which receives its water supply from the City of Roseville, which in turn receives its supply from SPRWS.

This study uses population projections consistent with the MCES System Statement for the City of Arden Hills. Historical data and projected water demands are used to estimate water demand through the year 2040 and to evaluate the existing water distribution system with respect to those demands. The planned 2040 land use from the Land Use Plan was used to identify specific areas of development and the associated improvements that will be required to serve those areas.

Data Available

The following sources of information were used to prepare this report:

- Water Supply Plan for the City of Arden Hills, prepared by WSB & Associates, Inc.
- MCES System Statement for the City of Arden Hills
- MCES Community Profile for the City of Arden Hills
- Water usage data as reported by the City to the DNR's Minnesota Permitting and Reporting System (MPARS)

General Contact Information

City of Arden Hills Water System
DNR Water Appropriation Permit Numbers: 1975-6227
Ownership: Public
Metropolitan Council Area, Hennepin County
MDH Supplier Classification: Municipal

Public Works Director & City Engineer: Sue Polka
1245 W Highway 96
Arden Hills, MN 55112
Phone: (651) 792-7846

Water Use Categories and Definitions

General water use categories and definitions used in this report, as defined by the Department of Natural Resources, are as follows:

- **Residential** uses consist of water being used for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.
- **Institutional** uses consist of those for hospitals, nursing homes, day care centers, and other facilities that use water for essential domestic requirements. This includes public facilities and public metered uses. Institutional water-use records are typically maintained for emergency planning and allocation purposes.
- **Commercial** uses consist of water used by motels, hotels, restaurants, office buildings, and commercial facilities.
- **Industrial** uses consist of water used for thermoelectric power (electric utility generation) and other industrial uses such as steel, chemical and allied products, food processing, paper and allied products, mining, and petroleum refining.
- **Wholesale deliveries** consist of bulk water sales to other public water suppliers.
- **Unaccounted water** is the volume of water withdrawn from all sources minus the volume sold.
- **Non-essential water uses** as defined by Minnesota Statutes 103G.291, include lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses. Some of the above categories also include non-essential uses of water.

EXISTING SYSTEM

The existing water distribution system for the City of Arden Hills is shown in **Figure 1**. It currently serves nearly 9,800 customers. The system consists of approximately 55 miles of watermain, including CIP, DIP, and PVC pipe ranging from 4-inch to 16-inch diameter. The existing water system is divided into two pressure zones, north and south. The north zone is supplied by a booster station, and each pressure zone has one elevated storage facility.

Water Sources and Treatment

The City of Arden Hills receives its water supply from the City of Roseville, which in turn receives its supply from SPRWS. The SPRWS Water Supply Plan is included with this report by reference. Water treatment is provided by SPRWS, and no further treatment is required by the City of Arden Hills.

The City has three service connection points with the City of Roseville:

1. Cleveland Avenue and County Road D (12-inch)
2. Fairview Avenue and County Road D (16-inch to 12-inch)
3. Hamline Avenue North and Glenhill Road (16-inch)

In addition to the three service connection points with the City of Roseville, Arden Hills also has three emergency interconnections:

1. City of Shoreview – North of Grey Fox Road on Lexington Avenue (8-inch)
2. City of Shoreview – North of Cummings Park Drive on Lexington Avenue (8-inch)
3. City of New Brighton – East of Cleveland Avenue on Stowe Avenue (8-inch)

Water Storage

Each pressure zone in the system has one elevated storage facility. The North Tower at the intersection of Innovation Way and Cummings Park Drive was constructed in 1968 and has a capacity of 500,000 gallons. The South Tower on Red Fox Road was constructed in 1986 and has a capacity of 1,000,000 gallons. The east side booster station is located at the site of the South Tower.

Water Distribution

The City's water distribution system includes CIP, DIP, and PVC watermain of 4-inch to 16-inch nominal diameter. The trunk watermain between the two towers is 16-inch, the trunk watermain elsewhere is 12-inch, and the remainder of the watermain is largely 6-inch and 8-inch diameter.

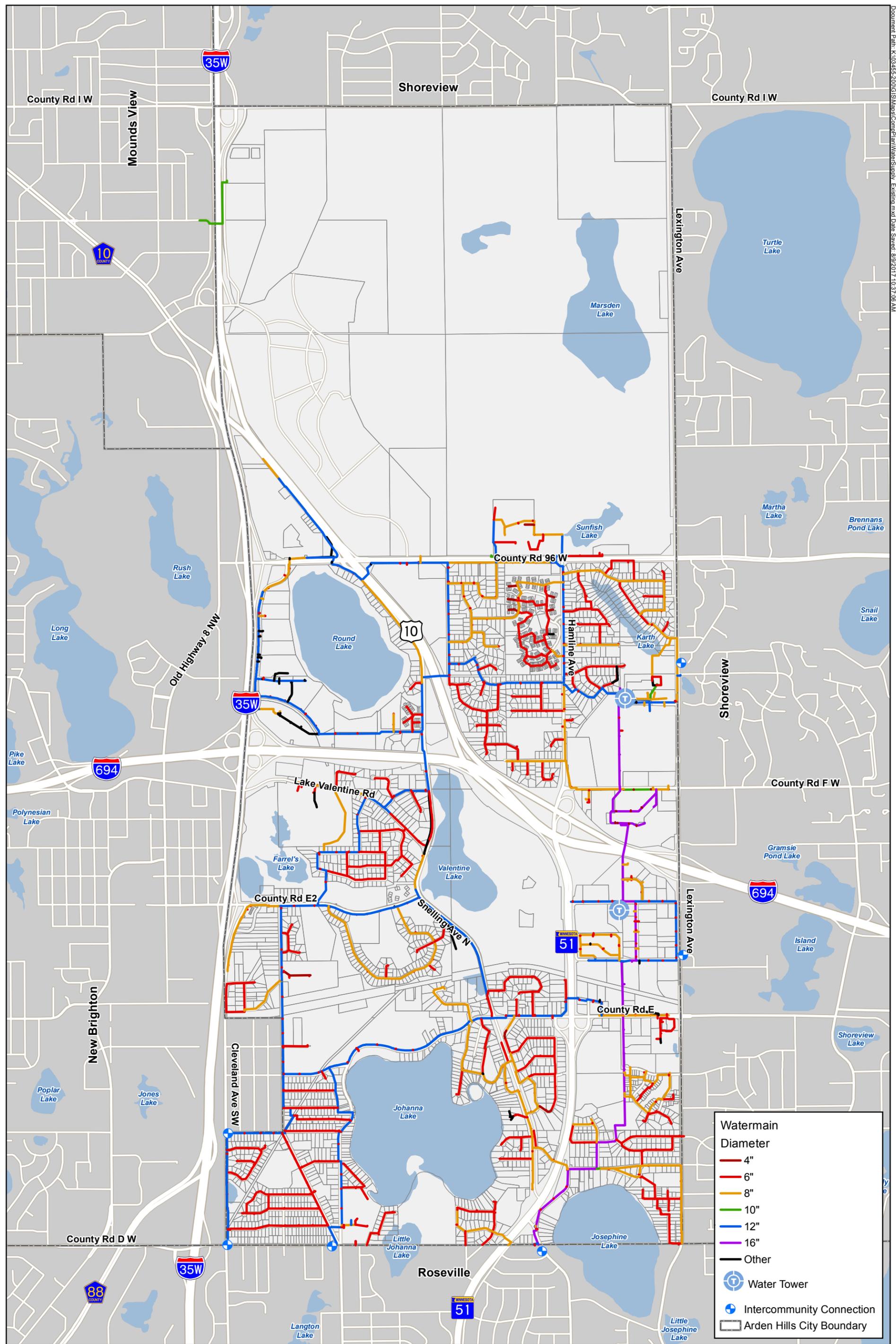


Figure 1 - Existing Water Supply System
 2040 Comprehensive Plan
 Arden Hills, MN



0 2,000 Feet
 1 inch = 2,000 feet



POPULATION AND WATER DEMAND

The population served by the City of Arden Hills water system has grown steadily over the last five years. The total population served by the system in 2015 was 9,780. Population and water use and demand data from the past ten years are listed in **Table 1**.

Despite the growth in the population served by the City’s water system, residential and total per capita water demands have decreased over the last five years. It is likely that high efficiency appliances, decreased irrigation, general attitudes toward conservation, rainfall and climate all play a role in this trend.

Table 1 – Historical Water Demand

Year	Pop. Served	Total Connections	Total Water Use (MG)	Total Water Pumped (MG)	Percent Unmetered/Unaccounted	Average Daily Demand (MGD)	Residential Per Capita Demand (GPCD)	Total Per Capita Demand (GPCD)
2005	9,565 est.	2,564	-	452	-	1.24	50	130
2006	9,564 est.	2,429	-	480	-	1.31	53	137
2007	9,563 est.	2,521	421	465	9.5%	1.27	60	133
2008	9,562 est.	-	374	454	17.6%	1.24	55	130
2009	9,561 est.	-	375	483	22.4%	1.32	57	138
2010	9,560	2,558	349	424	17.6%	1.16	47	122
2011	9,604 est.	2,558	355	415	14.6%	1.14	50	118
2012	9,648 est.	2,581	386	464	16.8%	1.27	54	132
2013	9,692 est.	2,596	321	424	24.2%	1.16	46	120
2014	9,736 est.	2,601	300	359	16.5%	0.98	39	101
2015	9,780 est.	2,608	306	322	4.8%	0.88	37	90
Avg. 2010-2015	9,670	2,584	336	401	15.7%	1.10	46	114

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day

Table 2 lists the top 10 water users by volume, from largest to smallest, for the City of Arden Hills.

Table 2 – Large Volume Users

Customer	Category	Water Use (gallons per year)	Percent of Total Water Use
Bethel University	Institutional	19,559,954	6.2%
Arden Manor Mobile Home	Residential	19,282,614	6.1%
University of Northwestern	Institutional	9,776,996	3.1%
Boston Scientific (Bldg. 5, 7, 9)	Industrial	9,684,739	3.1%
Boston Scientific (Bldg. B & C)	Industrial	9,657,338	3.0%
Johanna Shores	Residential	9,071,148	2.9%
International Paper	Industrial	6,774,002	2.1%
Land O' Lakes	Industrial	5,720,401	1.8%
Boston Scientific (Bldg 10)	Industrial	4,418,409	1.4%
Mounds View High School	Institutional	4,124,607	1.3%

Existing Water Conservation Policies

Although Minnesotans benefit from the state's abundant water supplies, those supplies are finite and potential threats exist that could impact the quality of our drinking water. Factors that can potentially limit water supply include population increases, economic trends, uneven statewide availability of groundwater, climate change, and degraded water quality. There are many benefits to enacting water conservation policies that the City has already implemented and will continue to pursue.

The average total water used per year in the City of Arden Hills from 2010 to 2015 was 336 million gallons, with an average of 15.7 percent of that usage being unmetered or unaccounted. The average residential per capita demand has been decreasing steadily since 2012. From 2010 to 2015 the average residential per capita use was 46 gallons per day, which is well below the DNR's recommended residential demand target of 75 gallons per capita per day. As previously discussed, the decrease in residential per capita demand may be attributed to high efficiency appliances, decreased irrigation, general attitudes toward conservation, rainfall and climate.

GROWTH AND DEMAND PROJECTIONS

The City of Arden Hills is currently experiencing new development and growth. The City's projected population and demands are listed in **Table 3**. The population projections were linearly extrapolated from the Metropolitan Council estimates for the years 2020, 2030, and 2040. It was assumed that all new population growth will be serviced by the municipal water system. The projected total per capita water demand was obtained from MCES and the peaking factor used to calculate maximum day demand was determined from the City's historical water use data. The maximum day demand is expected to increase to 7.23 MGD by the year 2040.

Table 3 – Projected Annual Water Demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Day Demand (MGD)	Projected Maximum Day Demand (MGD)
2017	9,870	9,870	123	1.21	3.64
2018	9,910	9,910	123	1.22	3.66
2019	9,960	9,960	123	1.23	3.68
2020	10,000	10,000	123	1.23	3.69
2021	10,200	10,200	123	1.33	3.99
2022	10,400	10,400	123	1.43	4.29
2023	10,600	10,600	123	1.53	4.59
2024	10,800	10,800	123	1.63	4.89
2025	11,000	11,000	123	1.73	5.18
2030	12,000	12,000	123	2.23	6.68
2040	13,500	13,500	123	2.41	7.23

GPCD – Gallons per Capita per Day **MGD** – Million Gallons per Day

Future Water Conservation Policies

The Minnesota DNR has established eight water conservation objectives and strategies. These are listed below with comments on the City of Arden Hills' progress towards the completion of each.

1. Reduce unaccounted (non-revenue) water loss to less than 10 percent.
 - The City's average unaccounted water use from 2010 to 2015 was 15.7 percent, which is above the recommended target of 10 percent. The City performs leak detection and water audits periodically as needed and will consider metering water use during hydrant flushing, ice rink flooding, and other water supplier service activities.
 - A total of 2,620 metered connections in Arden Hills are tested as needed. The average age of the City's existing meters is three years, and meters are replaced as needed.
2. Achieve residential demand of less than 75 gallons per capita per day.
 - The average residential per capita water demand for the City of Arden Hills from 2010 to 2015 was 46 gallons per capita per day (gpcd), which is less than the 75 gpcd target. This demand has been decreasing steadily since 2012.
 - In order to continue reducing residential demand, the City will revise its ordinances on water efficient landscaping and water reuse, revise its ordinance to limit irrigation, continue to make water system improvements, continue to provide incentives for installing water efficient appliances and fixtures, and continue to conduct water conservation education and outreach.
3. Achieve at least a 15 percent reduction in per capita daily demand across all customer categories over the next 10 years.
 - Although the City of Arden Hills residential per capita water demand is already quite low and achieving this level of reduction may be infeasible, the City will conduct facility water use audits annually, install enhanced water meters, install conservation fixtures and appliances, repair leaking system components, investigate water reuse, reduce outdoor water use, and train employees on how to conserve water.
4. Achieve a decreasing trend in total per capita demand.
 - Total per capita, residential, and commercial/industrial/institutional water demands have all shown a decreasing trend since 2012. Residential demand has shown a more marked trend, and conservation measures that target household water use are likely the reason for this trend. A graph showing total per capita water demand by customer category is included in **Appendix 8**.
5. Reduce peak day demand so that the ratio of maximum to average day demand is less than 2.6.
 - The City does not have the ability to measure maximum day demands, so this ratio is unknown.

6. Implement a conservation water rate structure
 - The water rates in Arden Hills are based on an increasing block rate structure. This rate structure promotes water conservation because the price is volume-tiered. Water billing in Arden Hills is done on a quarterly schedule, and the billing structure is evaluated every year with the last change made in January 2016, included in **Appendix 9**.
7. Additional strategies to reduce water use and support wellhead protection planning
 - The City of Arden Hills will participate in the GreenStep Cities program, implement a water conservation outreach program, and implement a rebate program for water efficient appliances and fixtures.
8. Tracking success
 - The City will continue to monitor water usage by customer category and participate in the GreenStep Cities program.

Regulation

The City of Arden Hills has implemented several regulations to reduce demand and improve efficiency in its water system. Water efficient plumbing fixtures are required in new development, air conditioning systems connected to the public water system must be equipped with water conserving and water regulating devices, and a critical water deficiency ordinance is in place. A summary of these regulations is included in **Appendix 10**.

Retrofitting Programs

The Rice Creek Watershed District (RCWD) has cost-share funds available for stormwater management projects that improve surface water quality, such as rain gardens, rain barrels, and water efficient landscaping.

Education and Outreach

The City has implemented, or plans to implement, the following education and outreach programs:

- Consumer Confidence Reports prepared annually
- Press releases to local news outlets every six months
- Staff training includes awareness of conservation goals
- *Arden Notes* newsletters prepared every four months
- Information available on the City website (<http://www.cityofardenhills.org/>)
- Additional programs by SPRWS

PROPOSED IMPROVEMENTS

The City of Arden Hills' existing water system will require improvements to satisfy future development and demand, particularly related to the TCAAP development in the north part of the City. **Table 4** lists the improvements proposed, along with their estimated timing and costs. The proposed system is shown in **Figure 2**. In addition, a copy of the City's Capital Improvement Plan for 2017-2021 is included in **Appendix 4**.

Table 4 – Proposed Capital Improvements

Year(s)	Improvement	Estimated Cost*
Annual	Valve Replacement	\$35,000
Biennial	Hydrant Replacement	\$40,000
2018	Water Tower Repair and Repainting	\$900,000
	County Road E2/Old Hwy 10 Water Loop	\$855,000
2019	TCAAP Booster Station	\$1,000,000
	TCAAP Trunk Improvements	\$1,000,000
	TCAAP Water Tower	\$3,400,000

*Values listed include both direct and indirect costs.

Proposed Sources and Treatment

There are no improvements planned for the City's three existing service connections to the City of Roseville, which in turn receives its water supply from SPRWS.

Proposed Storage

As a result of water system modeling with WaterCAD by WSB & Associates, Inc. using the projected water demands with the TCAAP development, it was determined that the system will require an additional one million gallons of storage capacity in the north pressure zone. It is recommended that the City begin the planning process for this 1 MG water tower as soon as possible. Modeling also indicated that the existing North Tower will require the installation of an altitude valve concurrent with the construction of the TCAAP Tower.

Proposed Booster Station

The north pressure zone is currently maintained by the east side booster station. The projected water demand with the TCAAP development will require an additional west side booster station along Snelling Ave N / Old Hwy 10, with a firm capacity of 1,500 gpm.

Proposed Distribution

In order to satisfy projected water demands and fire flows for the TCAAP development, modeling indicates that two 12-inch trunk watermains will be required. The approximate routing of the proposed watermain is shown in **Figure 2**.

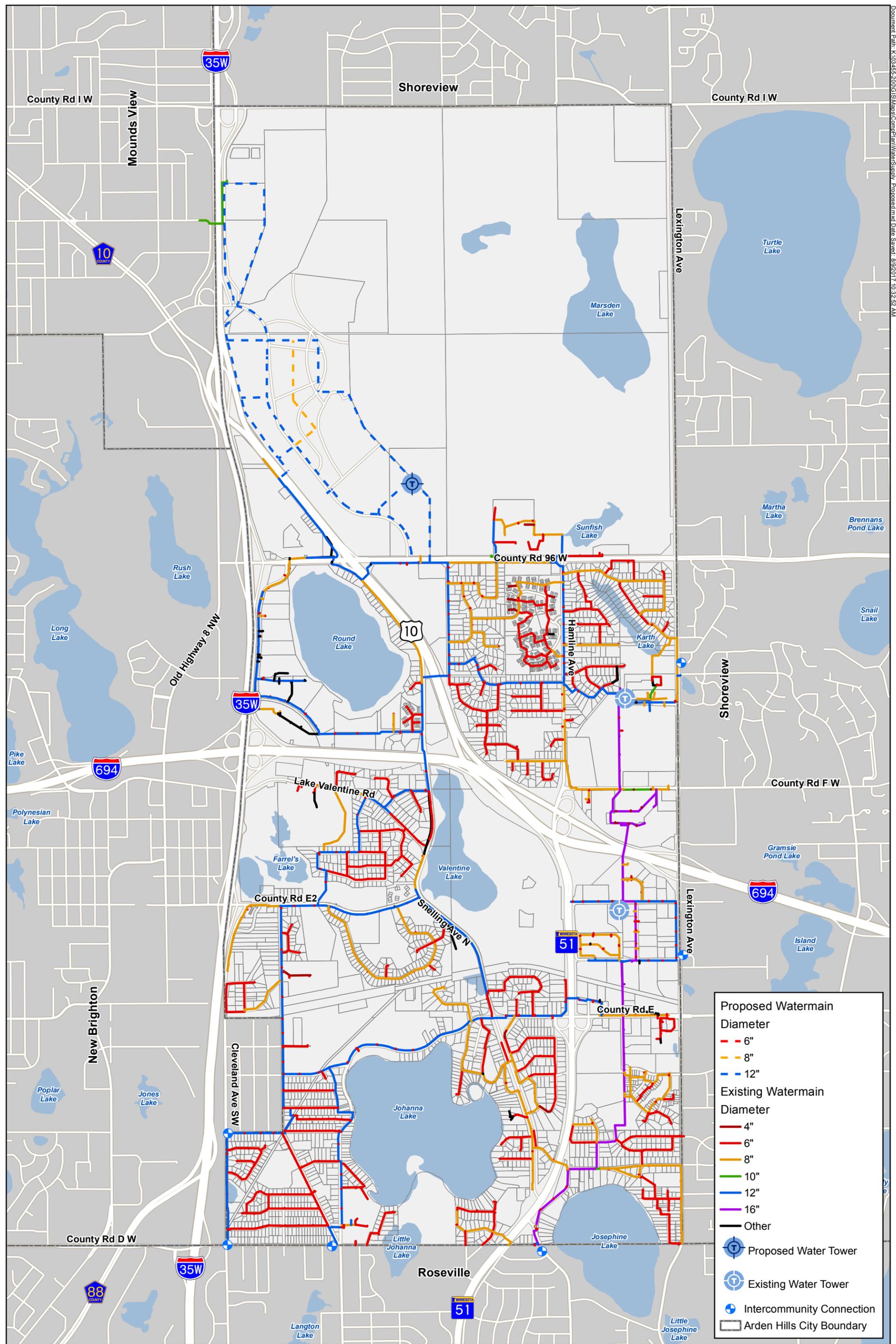


Figure 2 - Proposed Water Supply System
2040 Comprehensive Plan
Arden Hills, MN



0 2,000 Feet
1 inch = 2,000 feet



EMERGENCY PREPAREDNESS PROCEDURES

Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failures, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan.

Federal Emergency Response Plan

Community water suppliers serving over 3,300 people are required to prepare an Emergency Response Plan by Section 1433(b) of the Safe Drinking Water Act, as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188, Title IV – Drinking Water Security and Safety).

The City of Arden Hills has a Federal Emergency Response Plan that was certified in 2005. The contacts for this plan are:

Emergency Response Lead: Bill Joynes
Phone: (651) 792-7810
Email: wjoynes@cityofardenhills.org

Alternate Emergency Response Lead: Jeff Frid
Phone: (651) 755-1461
Email: jfrid@cityofardenhills.org

Operational Contingency Plan

The State recommends that all utilities develop an operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures, as well as for routine maintenance. A contact list for contractors and suppliers and a water emergency telephone list that act as an Operational Contingency Plan are included in **Appendix 5**.

Emergency Response Procedures

In the case of an emergency, City staff must have quick access to concise and detailed information on the water supply system, including maps and operation and maintenance manuals. This information should be maintained in secured central and back-up locations, in both electronic and hard copy formats.

The City of Arden Hills maintains records and maps of the water system. City staff can access these resources from a central secured location in the event of an emergency, and appropriate staff know where these resources are located.

Procedures for Augmenting Water Supplies

The City of Arden Hills has three emergency interconnections with other communities, in addition to its three service connections with the City of Roseville. Two emergency interconnections are with the City of Shoreview at the intersections of Lexington & Grey Fox and Lexington & Cummings Park through 8-inch watermain, each with a capacity of 500 gpm. The third emergency interconnection is with the City of New Brighton at the intersection of Cleveland & Stowe through 8-inch watermain, also with a capacity of 500 gpm. Copies of the cooperative agreements for these interconnections are included in **Appendix 6**.

In the case of an emergency, the City will coordinate its response with SPRWS. Additional information can be found in the SPRWS Water Supply Plan.

Allocation and Demand Reduction Procedures and Triggers

The City must prepare procedures to address gradual decreases in water supply, as well as emergencies and the sudden loss of water due to line breaks, power failures, sabotage, etc. These allocation and demand reduction procedures must be consistent with Minnesota State Statute 103G.261, that identifies and defines the priorities in which water usage will be allocated in the event of an emergency. They are defined as follows:

1. Domestic water supply only, excluding industrial and commercial uses of municipal water supply. The first priority also includes uses for power production that meet contingency requirements. Domestic use is defined by MN Rules 6115.0630, Subp. 9, as use for general household purposes for human needs such as cooking, cleaning, drinking, washing, and waste disposal, and uses for on-farm livestock watering excluding commercial livestock operations which use more than 10,000 gallons per day or one million gallons per year.
2. Consumption of less than 10,000 gallons per day.
3. Agricultural irrigation and processing of agricultural products of more than 10,000 gallons per day.
4. Power production in excess of the use provided for in the contingency plan.
5. All other water use of more than 10,000 gallons per day.
6. Non-essential uses. These uses are defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses.

Table 5 lists the priority ranking, average day demand, and demand reduction potential for each customer category in the City.

Table 5 – Water Use Priorities

Customer Category	Allocation Priority	Average Day Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	440,900	*
Comm./Ind./Inst.	2	480,200	*
Non-Essential	3	-	177,200
Total	-	921,100	177,200

GPD – Gallons per Day

* Non-essential use calculated as increased summer demand across all customer categories

The City of Arden Hills will use the following conditions to trigger an emergency response:

- Contamination
- Loss of Production
- Infrastructure Failure
- Governor’s Executive Order

The City of Arden Hills has identified the following short-term and long-term actions to be implemented as part of an emergency response:

Short-term Actions

- Enforce its critical water deficiency ordinance
- Allocate water through emergency action of the City Council
- Encourage voluntary reduction through public service announcements

Long-term Actions

- Supply augmentation through interconnections
- Enforce its critical water deficiency ordinance
- Allocate water through emergency action of the City Council
- Meet with large water users to discuss their contingency plan

Notification Procedures

The City of Arden Hills has developed the following plan to inform customers regarding conservation requests, water use restrictions, and suspensions; with the support of City staff, neighboring communities, and local news outlets:

Short-term demand reduction declared (within one year)	Long-term demand reduction declared (over one year)	Governor's Critical water deficiency declared
Frequency: Monthly	Frequency: Annually	Frequency: As Needed
<ul style="list-style-type: none">▪ Website▪ Social media (e.g. Twitter, Facebook)▪ Direct customer mailing▪ Press release (TV, radio, newspaper)	<ul style="list-style-type: none">▪ Website▪ Social media (e.g. Twitter, Facebook)▪ Direct customer mailing▪ Press release (TV, radio, newspaper)	<ul style="list-style-type: none">▪ Website▪ Social media (e.g. Twitter, Facebook)▪ Direct customer mailing▪ Press release (TV, radio, newspaper)

Enforcement

Minnesota Statutes require public water supply authorities to adopt and enforce water conservation restrictions during periods of critical water shortages. As stated in Minnesota Statutes 103G.291, Subdivision 1, regarding public water supply appropriation during deficiency, if the governor determines and declares by executive order that there is a critical water deficiency, public water supply authorities appropriating water must adopt and enforce water conservation restrictions within their jurisdiction that are consistent with rules adopted by the commissioner. The restrictions must limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses, and have appropriate penalties for failure to comply with the restrictions.

The City has a critical water deficiency ordinance defined in Arden Hills City Code, Chapter 10 – Utilities, Section 1000 – Water. A copy of this ordinance is included in **Appendix 7**. The City has authorized the City Administrator to have standing authority to implement water restrictions, which improves response times for dealing with water emergencies.

Appendix A
Water Supply Plan

Local Water Supply Plan Template Third Generation for 2016-2018

Formerly called Water Emergency & Water Conservation Plan



Cover photo by Molly Shodeen



For more information on this Water Supply Plan Template, please contact the DNR Division of Ecological and Water Resources at (651) 259-5034 or (651) 259-5100.

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This information is available in an alternative format upon request.

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DEPARTMENT OF NATURAL RESOURCES – DIVISION OF ECOLOGICAL AND WATER RESOURCES AND METROPOLITAN COUNCIL

INTRODUCTION TO WATER SUPPLY PLANS (WSP)

Who needs to complete a Water Supply Plan

Public water suppliers serving more than 1,000 people, large private water suppliers in designated Groundwater Management Areas, and all water suppliers in the Twin Cities metropolitan area are required to prepare and submit a water supply plan.

The goal of the WSP is to help water suppliers: 1) implement long term water sustainability and conservation measures; and 2) develop critical emergency preparedness measures. Your community needs to know what measures will be implemented in case of a water crisis. A lot of emergencies can be avoided or mitigated if long term sustainability measures are implemented.

Groundwater Management Areas (GWMA)

The DNR has designated three areas of the state as Groundwater Management Areas (GWMAs) to focus groundwater management efforts in specific geographies where there is an added risk of overuse or water quality degradation. A plan directing the DNR's actions within each GWMA has been prepared. Although there are no specific additional requirements with respect to the water supply planning for communities within designated GWMAs, communities should be aware of the issues and actions planned if they are within the boundary of one of the GWMAs. The three GWMAs are the North and East Metro GWMA (Twin Cities Metro), the Bonanza Valley GWMA and the Straight River GWMA (near Park Rapids). Additional information and maps are included in the DNR webpage at <http://www.dnr.state.mn.us/gwmp/areas.html>

Benefits of completing a WSP

Completing a WSP using this template, fulfills a water supplier's statutory obligations under M.S. [M.S.103G.291](#) to complete a water supply plan. For water suppliers in the metropolitan area, the WSP will help local governmental units to fulfill their requirements under M.S. 473.859 to complete a local comprehensive plan. Additional benefits of completing WSP template:

- The standardized format allows for quicker and easier review and approval.
- Help water suppliers prepare for droughts and water emergencies.
- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.
- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.
- Fulfill the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.

- Upon implementation, contribute to maintaining aquifer levels, reducing potential well interference and water use conflicts, and reducing the need to drill new wells or expand system capacity.
- Enable DNR to compile and analyze water use and conservation data to help guide decisions.
- Conserve Minnesota’s water resources

If your community needs assistance completing the Water Supply Plan, assistance is available from your area hydrologist or groundwater specialist, the MN Rural Waters Association circuit rider program, or in the metropolitan area from Metropolitan Council staff. Many private consultants are also available.

WSP Approval Process

10 Basic Steps for completing a 10-Year Water Supply Plan

1. Download the DNR/Metropolitan Council Water Supply Plan Template www.mndnr.gov/watersupplyplans
2. Save the document with a file name with this naming convention:
WSP_cityname_permitnumber_date.doc.
3. The template is a form that should be completed electronically.
4. Compile the required water use data (Part 1) and emergency procedures information (Part 2)
5. The Water Conservation section (Part 3) may need discussion with the water department, council, or planning commission, if your community does not already have an active water conservation program.
6. Communities in the seven-county Twin Cities metropolitan area should complete all the information discussed in Part 4. The Metropolitan Council has additional guidance information on their webpage <http://www.metrocouncil.org/Handbook/Plan-Elements/Water-Resources/Water-Supply.aspx>. All out-state water suppliers do *not* need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document to insure all data is complete and attachments are included. This will allow for a quicker approval process. www.mndnr.gov/watersupplyplans
8. Plans should be submitted electronically – no paper documents are required. <https://webapps11.dnr.state.mn.us/mpars/public/authentication/login>
9. DNR hydrologist will review plans (in cooperation with Metropolitan Council in Metro area) and approve the plan or make recommendations.
10. Once approved, communities should complete a Certification of Adoption form, and send a copy to the DNR.

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	1975-6227
Ownership	Public
Metropolitan Council Area	Ramsey County
Street Address	1245 W. Highway 96
City, State, Zip	Arden Hills, MN, 55112
Contact Person Name	Sue Polka
Title	Public Works Director/City Engineer
Phone Number	651-792-7846
MDH Supplier Classification	Municipal

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

The City's customer categories are only residential and commercial.

Table 2. Historic water demand (see definitions in the glossary after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Water used for Non-essential	Total Water Delivered (MG)	Total Water Pumped (MG)	Percent Unmetered/Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand * (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)
2005	9,565 est.	2,564	174.50	-		-	452.40	-	1.24	n/a	n/a	49.98	129.58
2006	9,564 est.	2,429	185.90	-		-	479.50	-	1.31	n/a	n/a	53.25	137.36
2007	9,563 est.	2,521	210.38	210.41		420.79	464.84	9.48%	1.27	n/a	n/a	60.27	133.17
2008	9,562 est.	-	190.63	183.80		374.43	454.20	17.56%	1.24	n/a	n/a	54.62	130.14
2009	9,561 est.	-	197.52	177.32		374.84	483.05	22.40%	1.32	n/a	n/a	56.60	138.42
2010	9,560	2,558	164.03	185.41		349.45	424.24	17.63%	1.16	n/a	n/a	47.01	121.58
2011	9,604 est.	2,558	174.29	180.22		354.51	414.93	14.56%	1.14	n/a	n/a	49.72	118.37
2012	9,648 est.	2,581	191.82	194.04		385.86	463.52	16.75%	1.27	n/a	n/a	54.47	131.62
2013	9,692 est.	2,596	162.05	159.38		321.43	424.09	24.21%	1.16	n/a	n/a	45.81	119.88
2014	9,736 est.	2,601	139.76	159.92		299.68	358.93	16.51%	0.98	n/a	n/a	39.33	101.00
2015	9,780 est.	2,608	133.66	172.27		306.31	321.70	4.78%	0.88	n/a	n/a	37.44	90.12
Avg. 2010-2015	9,670	2,584	160.94	175.27		336.21	401.24	15.74%	1.10	n/a	n/a	45.63	113.76

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day; *City does not record daily readings on interconnection with Roseville

See Glossary for definitions

Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
Bethel University	Institutional	19,559,954	6.16%	Unknown
Arden Manor Mobile Home	Residential	19,282,614	6.08%	Unknown
University of Northwestern	Institutional	9,776,996	3.08%	Unknown
Boston Scientific (Bldg. 5, 7, 9)	Industrial	9,684,739	3.05%	Unknown
Boston Scientific (Bldg. B & C)	Industrial	9,657,338	3.04%	Unknown
Johanna Shores	Residential	9,071,148	2.86%	Unknown
International Paper	Industrial	6,774,002	2.13%	Unknown
Land O' Lakes	Industrial	5,720,401	1.80%	Unknown
Boston Scientific (Bldg 10)	Industrial	4,418,409	1.39%	Unknown
Mounds View High School	Institutional	4,124,607	1.30%	Unknown

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
See Saint Paul Regional Water Service (SPRWS)							
Total	NA		NA	NA		NA	

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
North Tower	Elevated storage	1968	Steel	500,000
South Tower	Elevated Storage	1986	Steel	1,000,000
Total	NA	NA	NA	1,500,000

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier’s projected average water demand over the next 10 years (see Table 7 for projected water demand):

The City of Arden Hills currently has 1.5 MG of storage between two elevated storage tanks. Ten State Standards recommends that a city’s storage capacity be equal to or greater than the average day demand. From 2010 to 2015, the average day demand was 1.10 MG; the City’s current storage capacity exceeds the average day demand by 0.40 MG. It is anticipated that the highest average day demand over the proceeding ten years will be approximately 2.13 MG, which will require additional storage capacity. The City proposes to add a 1.0 MG elevated storage facility in the northern section of the City.

The City purchases water from the City of Roseville, who directly purchases the water from the Saint Paul Regional Water Utility Service (SPRWS).

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.

Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1**.

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Interconnection	City of Roseville	n/a	n/a	19,445	n/a	Wholesale Interconnection	Yes

Limits on Emergency Interconnections

Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections, including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

The City has an agreement with the City of Roseville that the water supplied at interconnections will be at Roseville’s line pressure and that Arden Hills shall provide supplemental pumpage to meet pressure requirements for the Arden Hills system.

D. Future Demand Projections – Key Metropolitan Council Benchmark

Water Use Trends

Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

The historic trend shows a consistent increase in population served within the City of Arden Hills. As the population served increased, the total number of connections also increased.

The City has seen an overall decreasing trend in total per capita and average day water demands which can be observed from Table 2. Since the City is not able to record the amount of water pumped on individual days, trends in maximum daily demands are not available. It is likely that improved appliances, decrease in irrigation, general attitude towards conservation, rainfall and climate play a much larger role in water usage than other factors.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population ¹	Projected Population Served	Projected Total Per Capita Water Demand (GPCD)	Projected Average Daily Demand ¹ (MGD)	Projected Maximum Daily Demand (MGD)
2016	9,820	9,820	123	1.21	3.62
2017	9,870	9,870	123	1.21	3.64
2018	9,910	9,910	123	1.22	3.66
2019	9,960	9,960	123	1.23	3.68
2020	10,000	10,000	123	1.23	3.69
2021	10,200	10,200	123	1.33	3.99
2022	10,400	10,400	123	1.43	4.29
2023	10,600	10,600	123	1.53	4.59
2024	10,800	10,800	123	1.63	4.89
2025	11,000	11,000	123	1.73	5.18
2030	12,000	12,000	123	2.23	6.68
2040	13,500	13,500	123	2.41	7.23

GPCD – Gallons per Capita per Day

MGD – Million Gallons per Day;

¹Projected average daily demands include MetCouncil projections with the addition of 0.75 MGD for fully developed TCAAP site

Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

Population projections were obtained from the Metropolitan Council and from the assumption that the TCAAP redevelopment project will increase the average daily demand by 0.75 MGD by 2030. An average total per capita demand was determined from the City’s historic water usage data and was assumed to remain constant at 123 gallons per capita per day through 2040. Since the City is unable to record the amount of water pumped on individual days, trends in maximum day demands were not available. Therefore, a maximum day peaking factor of 3.0 was assumed to calculate the City’s projected maximum day water demands.

E. Resource Sustainability

Monitoring – Key DNR Benchmark

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. List should include all production wells, observation wells, and source water intakes or reservoirs. Add rows to the table as needed. Find information on groundwater level monitoring program at:

http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
See SPRWSP	<input type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2**. If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed.

Provide water level data graphs for each well in **Appendix 3** for the life of the well, or for as many years as water levels have been measured. See DNR website for Date Time Water Level <http://www.dnr.state.mn.us/groundwater/hydrographs.html>

Table 9. Water level data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
Unique # 225652	MTPL	2.4-feet	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	See Appendix 3
See SPRWS			<input type="checkbox"/> Falling <input type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____

Potential Water Supply Issues & Natural Resource Impacts – Key DNR & Metropolitan Council Benchmark

Complete Table 10 by listing the types of natural resources that are or could be impacted by permitted water withdrawals. If known, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be

taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the *Master Water Supply Plan Appendix 1 (Water Supply Profiles)*, provides information about potential water supply issues and natural resource impacts for your community.

Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
<input checked="" type="checkbox"/> River or stream		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	See SPRWS
<input checked="" type="checkbox"/> Calcareous fen		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	See SPRWS

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		<input type="checkbox"/> Other: _____				
<input checked="" type="checkbox"/> Lake		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	See SPRWS
<input type="checkbox"/> Wetland		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	
<input type="checkbox"/> Trout stream		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: ____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
<input checked="" type="checkbox"/> Aquifer		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: _____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	See SPRWS
<input type="checkbox"/> Endangered, threatened, or special concern species habitat, other natural resource impacts		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: _____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	

* Examples of thresholds: a lower limit on acceptable flow in a river or stream; water quality outside of an accepted range; a lower limit on acceptable aquifer level decline at one or more monitoring wells; withdrawals that exceed some percent of the total amount available from a source; or a lower limit on acceptable changes to a protected habitat.

Wellhead Protection (WHP) and Surface Water Protection (SWP) Plans

Complete Table 11 to provide status information about WHP and SWP plans.

The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health’s (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.

Table 11. Status of Wellhead Protection and Surface Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	<input type="checkbox"/> In Process <input type="checkbox"/> Completed <input checked="" type="checkbox"/> Not Applicable		
SWP	<input type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed ¹ <input type="checkbox"/> Not Applicable	May, 2005	N/A
¹ City of St. Paul Source Water Protection Plan			

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Water Storage Facilities	<input type="checkbox"/> No action planned - adequate <input checked="" type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2016-2020	-South and North Water Tower repairs -TCAAP Water Tower
Water Treatment Facilities	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Distribution Systems (pipes, valves, etc.)	<input type="checkbox"/> No action planned - adequate <input checked="" type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition	2017-2021	-Trunk water improvements

System Component	Planned action	Anticipated Construction Year	Notes
Pressure Zones	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2017	-Booster station
Other:	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		

Proposed Future Water Sources

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Groundwater	See SPRWS				
Surface Water					
Interconnection to another supplier					

Water Source Alternatives - Key Metropolitan Council Benchmark

Do you anticipate the need for alternative water sources in the next 10 years? Yes No

For metro communities, will you need alternative water sources by the year 2040? Yes No

If you answered yes for either question, then complete table 14. If no, insert NA.

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
<input type="checkbox"/> Groundwater	N/A					
<input type="checkbox"/> Surface Water	N/A					

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Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
<input type="checkbox"/> Reclaimed stormwater	N/A					
<input type="checkbox"/> Reclaimed wastewater	N/A					
<input type="checkbox"/> Interconnection to another supplier	N/A					

Part 2. Emergency Preparedness Procedures

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? Yes No

If yes, what was the date it was certified? 2005

Complete Table 15 by inserting the noted information regarding your completed Federal Emergency Response Plan.

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Number	Phone	Contact Email
Emergency Response Lead	Bill Joynes	651.792.7810		wjoynes@cityofardenhills.org
Alternate Emergency Response Lead	Jeff Frid	651.755.1461		jfrid@cityofardenhills.org

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes No

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280 . Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5**. A template is available at www.mndnr.gov/watersupplyplans

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes No

Can staff access records and maps from a central secured location in the event of an emergency?

Yes No

Does the appropriate staff know where the materials are located?

Yes No

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Municipalities are encouraged to execute cooperative agreements for potential emergency water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources.

WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
City of Shoreview (Lexington & Grey Fox)	500/0.72	Different supply source	8-inch watermain connection
City of Shoreview (Lexington & Cummings Park)	500/0.72	Different supply source	8-inch watermain connection
City of New Brighton (Cleveland & Stowe)	500/0.72	Different supply source	8-inch watermain connection

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
See SPRWS				

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

See SPRWS

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.
5. All other water use involving consumption of more than 10,000 gallons per day.

6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	440,900	
C/I/I	2	480,200	
Non-Essential	3		177,200*
TOTAL	NA	NA	177,200*

GPD – Gallons per Day; *Non-essential calculated as increased summer demand between all customer categories

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
<input checked="" type="checkbox"/> Contamination <input checked="" type="checkbox"/> Loss of production <input checked="" type="checkbox"/> Infrastructure failure <input checked="" type="checkbox"/> Executive order by Governor <input type="checkbox"/> Other: _____	<input type="checkbox"/> Supply augmentation through _____ <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Water allocation through emergency action of City Council <input checked="" type="checkbox"/> Voluntary reduction measures encouraged by public service.	<input checked="" type="checkbox"/> Supply augmentation through interconnection <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Water allocation through emergency action of City Council <input checked="" type="checkbox"/> Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
<input checked="" type="checkbox"/> Short-term demand reduction declared (< 1 year)	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Annually	<ul style="list-style-type: none"> • City Staff • Neighboring communities • Local news outlets
<input checked="" type="checkbox"/> Long-term Ongoing demand reduction declared	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input checked="" type="checkbox"/> Annually	<ul style="list-style-type: none"> • City Staff • Neighboring communities • Local news outlets
<input checked="" type="checkbox"/> Governor’s critical water deficiency declared	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually <input checked="" type="checkbox"/> As needed	<ul style="list-style-type: none"> • City Staff • Neighboring communities • Local news outlets

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority's water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes No

If yes, attach the official control document to this WSP as **Appendix 7**.

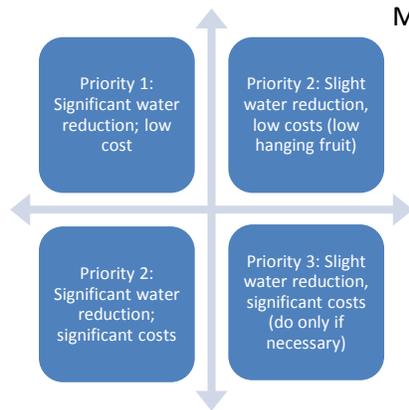
If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes No

If yes, cite the regulatory authority reference: Chapter 10, Section 1000.05 & 1000.13.

If no, who has authority to implement water use restrictions in an emergency?

PART 3. WATER CONSERVATION PLAN



Minnesotans have historically benefited from the state’s abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.

There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is use to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: “How can I help save water?”

Progress since 2006

Is this your community’s first Water Supply Plan? Yes No

If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

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If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change water rates structure to provide conservation pricing	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Educational efforts	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
New water conservation ordinances	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Enforcement	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Describe other	<input type="checkbox"/> Yes <input type="checkbox"/> No

What are the results you have seen from the actions in Table 21 and how were results measured?

The City updated the master meters tracking water that is being delivered from the City of Roseville. Based on utility billing City wide total per capita demand has been trending down.
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A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect surface water flows	<input type="checkbox"/> Low stream flow conditions <input checked="" type="checkbox"/> Reports of declining wetland and lake levels <input checked="" type="checkbox"/> Other: declining surface water quality	<input checked="" type="checkbox"/> Increase promotion of conservation measures <input checked="" type="checkbox"/> Other: Consider water reuse/stormwater irrigation projects

Objective	Triggers	Actions
Short-term demand reduction (less than 1 year)	<input checked="" type="checkbox"/> Extremely high seasonal water demand (more than double winter demand) <input type="checkbox"/> Loss of treatment capacity <input checked="" type="checkbox"/> Lack of water in storage <input checked="" type="checkbox"/> State drought plan <input type="checkbox"/> Well interference <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Adopt (if not already) and enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Supply augmentation through emergency interconnections <input checked="" type="checkbox"/> Water allocation through emergency interconnections <input type="checkbox"/> Meet with large water users to discuss user’s contingency plan.
Long-term demand reduction (>1 year)	<input checked="" type="checkbox"/> Per capita demand increasing <input type="checkbox"/> Total demand increase (higher population or more industry) Water level in well(s) below elevation of _____ <input checked="" type="checkbox"/> Other: Declared emergency	<input checked="" type="checkbox"/> Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. <input type="checkbox"/> Meet with large water users to discuss user’s contingency plan. <input checked="" type="checkbox"/> Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor’s “Critical Water Deficiency Order” declared	<input checked="" type="checkbox"/> Governor declaration as needed	<input checked="" type="checkbox"/> Take action as directed by the governor

B. Conservation Objectives and Strategies – Key benchmark for DNR

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Waters Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your five-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

Yes No

What is your leak detection monitoring schedule? (e.g. monitor 1/3rd of the city lines per year)

Periodic as needed.

Water Audits - are intended to identify, quantify and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The American Water Works Association (AWWA) recommends that ten percent or less of pumped water is unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association www.mrwa.com . Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built.

What is the date of your most recent water audit? n/a

Frequency of water audits: yearly other (specify frequency) periodic as needed

Leak detection and survey: every year every other year periodic as needed

Year last leak detection survey completed: n/a

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

City will consider metering water during hydrant flushing, flooding ice rinks, etc..

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer’s point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. AWWA also recommends that water suppliers conduct regular water audits to ensure accountability. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years)
Residential	2,486	2,486	2,486	As needed	3 years / Replace as needed
Commercial	134	134	134	As needed	3 years / Replace as needed
TOTALS	2,620	2,620	2,620	N/A	N/A

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

None, the entire system is metered.

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years)
Water source (wells/intakes)	See SPRWS			___ / ___
Treatment plant	N/A			___ / ___

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? Yes No

What was your 2010 – 2015 five-year average residential per capita water demand? 45.63 gallons/person/day

Describe the water use trend over that timeframe:

Residential per capita water use did not show a strong trend from 2005-2012, but it has been decreasing steadily since 2012. At no time in the last ten years was the residential per capita water use higher than the DNR’s recommended maximum of 75 gallons per capita per day.

Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
<input checked="" type="checkbox"/> Revise city ordinances/codes to encourage or require water efficient landscaping.	1-3 years following adoption of this plan
<input checked="" type="checkbox"/> Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	Annually
<input checked="" type="checkbox"/> Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	3-6 years following adoption of this plan

Strategy to reduce residential per capita demand	Timeframe for completing work
<input type="checkbox"/> Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	
<input checked="" type="checkbox"/> Make water system infrastructure improvements	Ongoing
<input type="checkbox"/> Offer free or reduced cost water use audits) for residential customers.	
<input type="checkbox"/> Implement a notification system to inform customers when water availability conditions change.	
<input checked="" type="checkbox"/> Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	Ongoing
<input type="checkbox"/> Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input type="checkbox"/> Identify supplemental Water Resources	
<input checked="" type="checkbox"/> Conduct audience-appropriate water conservation education and outreach.	Ongoing
<input type="checkbox"/> Describe other plans	

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.

Complete Table 26 by checking which strategies you will used to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not allowed by the state plumbing code, M.R. 4715 (a variance is needed). However several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
<input checked="" type="checkbox"/> Conduct a facility water use audit for both indoor and outdoor use, including system components	Annually
<input checked="" type="checkbox"/> Install enhanced meters capable of automated readings to detect spikes in consumption	Ongoing
<input type="checkbox"/> Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.)	

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
<input checked="" type="checkbox"/> Install water conservation fixtures and appliances or change processes to conserve water	Ongoing
<input checked="" type="checkbox"/> Repair leaking system components (e.g., pipes, valves)	Ongoing
<input checked="" type="checkbox"/> Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	Ongoing
<input checked="" type="checkbox"/> Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	Ongoing
<input checked="" type="checkbox"/> Train employees how to conserve water	Ongoing – include for new employee training
<input type="checkbox"/> Implement a notification system to inform non-residential customers when water availability conditions change.	
<input type="checkbox"/> Rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Proposed plumbing code 4714.1702.1 http://www.dli.mn.gov/PDF/docket/4714rule.pdf	
<input type="checkbox"/> Describe other plans:	

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

There is a decreasing trend in total per capita water demand, as well as decreasing trends for both the residential and the C/I/I customer categories. The decreasing trend has been most pronounced in the last five years, since 2012. Residential demand shows a slightly clearer decreasing trend, so conservation and education efforts that impact household water use, such as rebate programs for improved fixtures and appliances and ordinance governing water use for air conditioning, are likely the reason for this trend.

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6? Yes No Unknown

Calculate a ten year average (2005 – 2014) of the ratio of maximum day demand to average day demand: Unknown

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of Health or before requesting an increase in water appropriations permit volume (*Minnesota Statutes*, section 103G.291, subd. 3 and 4). Rates should be adjusted on a regular basis to ensure that revenue of the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

Volume included in base rate or service charge: 1,000 gallons or ___ cubic feet ___ other

Frequency of billing: Monthly Bimonthly Quarterly Other: _____

Water Rate Evaluation Frequency: every year every ___ years no schedule

Date of last rate change: January 2016

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	<input type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons	<input type="checkbox"/> Uniform <input type="checkbox"/> Odd/even day watering	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
	<input type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)		
Commercial/ Industrial/ Institutional	<input type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input type="checkbox"/> Use water bill to provide comparisons <input type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
<input type="checkbox"/> Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
 - The first tier is for the winter average water use.
 - The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
 - The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands
- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates
- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals. **Excess Use rates:** if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons:** simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate:** rate per unit used is the same regardless of the volume used

- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

--

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at least two of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

<input checked="" type="checkbox"/>	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 “Best Practices” for water
<input type="checkbox"/>	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
<input type="checkbox"/>	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
<input type="checkbox"/>	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
<input type="checkbox"/>	Adopt an outdoor lawn irrigation ordinance
<input type="checkbox"/>	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
<input type="checkbox"/>	Implement a stormwater management program
<input type="checkbox"/>	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws- for vernal pools, buffer areas, restrictions on filling or alterations)
<input type="checkbox"/>	Adopt a water offset program (primarily for new development or expansion)
<input checked="" type="checkbox"/>	Implement a water conservation outreach program
<input type="checkbox"/>	Hire a water conservation coordinator (part-time)
<input checked="" type="checkbox"/>	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
<input type="checkbox"/>	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

Continue to monitor water usage by customer category and participation in the GreenStep Cities program.

Tip: The process to monitor demand reduction and/or a rate structure includes:

- a) The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
- b) They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
- c) The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
- d) They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
- e) If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

A. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
<input type="checkbox"/> Rainfall sensors required on landscape irrigation systems	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input checked="" type="checkbox"/> Water efficient plumbing fixtures required (All air conditioning systems which are connected directly or indirectly with the public water system shall be equipped with water conserving and water regulating devices as approved by the City Administrator.)	<input checked="" type="checkbox"/> New development <input checked="" type="checkbox"/> Replacement <input type="checkbox"/> Rebate Programs
<input checked="" type="checkbox"/> Critical/Emergency Water Deficiency ordinance	<input checked="" type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Watering restriction requirements (time of day, allowable days, etc.)	<input type="checkbox"/> Odd/even <input type="checkbox"/> 2 days/week <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water waste prohibited (for example, having a fine for irrigators spraying on the street)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Soil preparation requirements (after construction, requiring topsoil to be applied to promote good root growth)	<input type="checkbox"/> New Development <input type="checkbox"/> Construction Projects <input type="checkbox"/> Other
<input type="checkbox"/> Tree ratios (requiring a certain number of trees per square foot of lawn)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other

Regulations Utilized	When is it applied (in effect)?
<input type="checkbox"/> Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	<input type="checkbox"/> Describe

B. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. It is recommended that municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

Water Use Targets	Outreach Methods	Partners
<input type="checkbox"/> Low flush toilets, <input type="checkbox"/> Toilet leak tablets, <input type="checkbox"/> Low flow showerheads, <input type="checkbox"/> Faucet aerators;	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input type="checkbox"/> Water conserving washing machines, <input type="checkbox"/> Dish washers, <input type="checkbox"/> Water softeners;	<input type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input checked="" type="checkbox"/> Rain gardens, <input checked="" type="checkbox"/> Rain barrels, <input checked="" type="checkbox"/> Native/drought tolerant landscaping, etc.	<input checked="" type="checkbox"/> Education about grant and cost share opportunities <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input checked="" type="checkbox"/> Other: grants and cost-share programs	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input checked="" type="checkbox"/> Watershed organization: RCWD <input checked="" type="checkbox"/> Blue Thumb

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

RCWD has cost-share funds available to assist cities and individual landowners to implement stormwater management projects that will improve the quality of surface waters.

C. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Consumer Confidence Reports	Report of City's water quality	1/year	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)		2/year	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Presentations to community groups	See SPRWS		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Staff training	General awareness among staff about the City's goals for conservation		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Facility tours	See SPRWS		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Displays and exhibits	RCWD Stormwater Reuse workshop		<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community news letters	<i>Arden Notes</i> newsletter	3/year	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Direct mailings (water audit/retrofit kits, showerheads, brochures)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Information kiosk at utility and public buildings		2/year	<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Public service announcements			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Cable TV Programs			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Demonstration projects (landscaping or plumbing)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)	See SPRWS		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community events (children's water festivals, environmental fairs)	See SPRWS		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Community education classes	See SPRWS		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Water week promotions			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Website (include address: http://www.cityofardenhills.org)	Description of projects the City has completed, as well as future projects; Sustainability Report; Consumer Confidence Report		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Notices of ordinances	See SPRWS		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Emergency conservation notices	See SPRWS		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Other:			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

The City of Arden Hills will continue to provide educational opportunities for residents on water conservation through different forms of media.

See SPRWS for additional educational information.

Part 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.



Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The *Master Water Supply Plan* provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles)*. This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of

future water demand to be met using that approach, the timeframe to implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.

As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? Yes No

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
<input type="checkbox"/> None at this time		
<input checked="" type="checkbox"/> Comprehensive planning that guides development in vulnerable drinking water supply management areas	Comprehensive Plan update	St. Anthony Village, New Brighton, Mounds View, Shoreview
<input type="checkbox"/> Zoning overlay		
<input type="checkbox"/> Other:		

Technical assistance

From your community’s perspective, what are the most important topics for the Metropolitan Council to address, guided by the region’s Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- Coordination of state, regional and local water supply planning roles
- Regional water use goals
- Water use reporting standards
- Regional and sub-regional partnership opportunities
- Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- Others: _____

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled “low flow”. These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water “lost” by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category “Water Supplier Services”.

Population Served - The number of people who are served by the community’s public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community’s public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the

premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association

C/I/I – Commercial/Institutional/Industrial

CIP – Capital Improvement Plan

GIS – Geographic Information System

GPCD – Gallons per capita per day

GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,

MDH – Minnesota Department of Health

MGD – Million gallons per day

MG – Million gallons

MGL – Maximum Contaminant Level

MnTAP – Minnesota Technical Assistance Program (University of Minnesota)

MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)

MRWA – Minnesota Rural Waters Association

SWP – Source Water Protection

WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries – see Part 1C

Appendix 2: Water level monitoring plan – see Part 1E

Appendix 3: Water level graphs for each water supply well - see Part 1E

Appendix 4: Capital Improvement Plan - see Part 1E

Appendix 5: Emergency Telephone List – see Part 2C

Appendix 6: Cooperative Agreements for Emergency Services – see Part 2C

Appendix 7: Municipal Critical Water Deficiency Ordinance – see Part 2C

Appendix 8: Graph showing annual per capita water demand for each customer category during the last ten-years – see Part 3 Objective 4

Appendix 9: Water Rate Structure – see Part 3 Objective 6

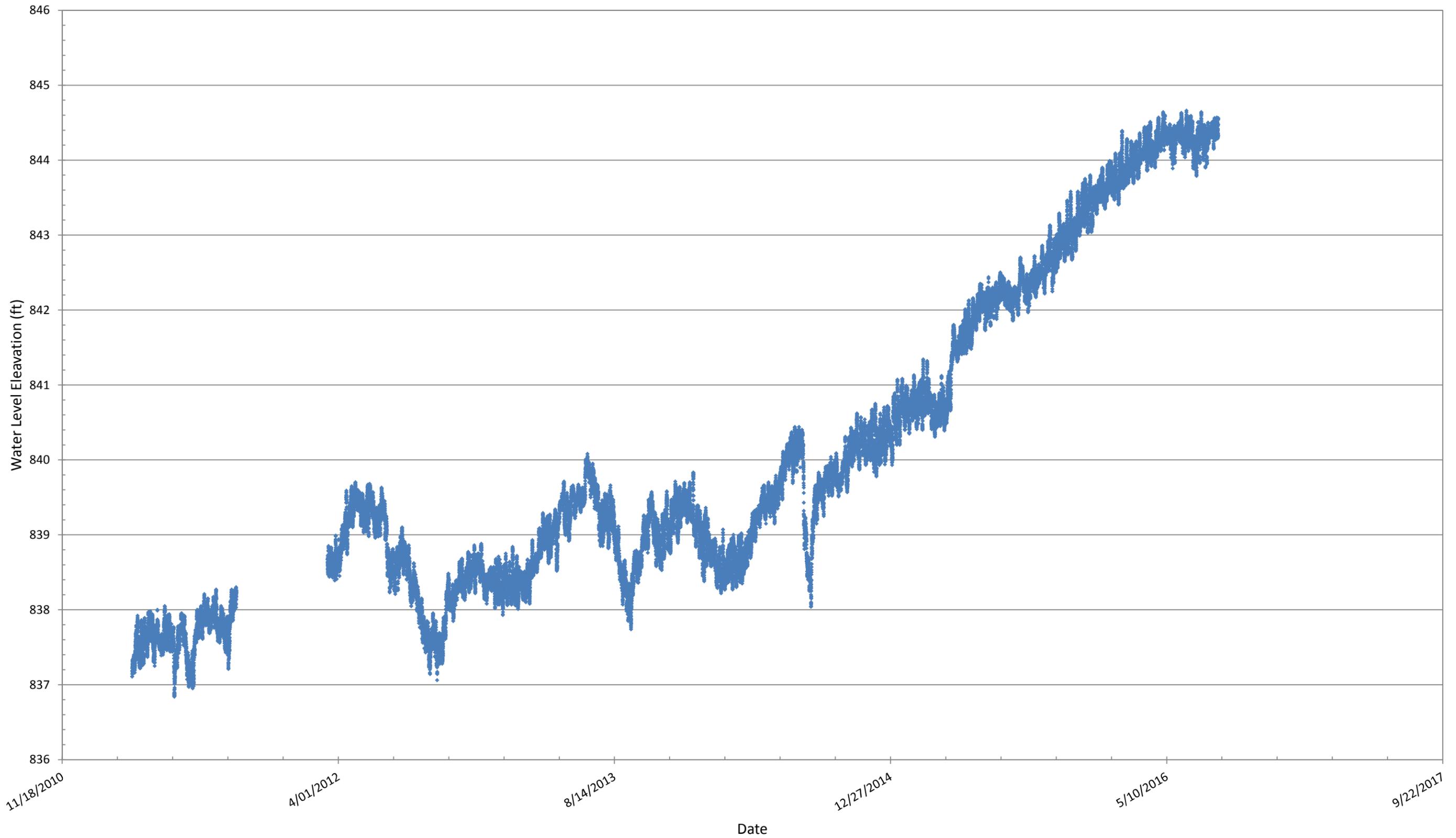
Appendix 10: Adopted or proposed regulations to reduce demand or improve water efficiency – see Part 3 Objective 7

Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates – see www.mndnr.gov/watersupplyplans

Appendix 3

Water Level Graphs for Production and Observation Wells

DNR Observation Well: Unique # 225652



Appendix 4

Capital Improvements Plan



***2017-2021
Proposed
CAPITAL IMPROVEMENT PLAN
EQUIPMENT REPLACEMENT PLAN***

**CITY OF ARDEN HILLS
Council Work Session November 21, 2016**



DATE: November 21, 2016

TO: Honorable Mayor and City Council Members

FROM: Sue Iverson, Interim City Administrator/Director of Finance and Admin Svcs
Dave Perrault, Finance Analyst

SUBJECT: 2017 – 2021 Capital Improvement Program (CIP)

Action Requested

Provide feedback to staff on Proposed 2017 – 2021 CIP Plan.

Background

Annually the City prepares a five (5) year Capital Improvement Plan for budgeting and forecasting.

Discussion

The City Council previously met on July 18th, 2016 to discuss the preliminary CIP and provide feedback and changes. The following changes since the July meeting have been made:

- Requested changes by City Council at previous meeting
- County Road D and Shoreview Drive has been removed due to completion in 2016.
- The Ramsey County Emergency Management Equipment has been updated following a new quote received on November 14th for the necessary upgrades.

Public Works will also be providing a supplementary memo for Council review and comments.

Attachment

Attachment A: Capital Improvement Plan Book

City of Arden Hills, Minnesota

Capital Improvement Plan

2017 thru 2021

PROJECTS BY DEPARTMENT

Department	Project#	Priority	2017	2018	2019	2020	2021	Total
Economic Development								
Gateway Signs	16-EDA-001	n/a	45,000	0				45,000
Economic Development Total			45,000	0				45,000
Government Buildings								
City Hall Maintenance	17-Bldg-005	2	50,000		25,000		25,000	100,000
Government Buildings Total			50,000		25,000		25,000	100,000
Parks Department								
Playground Structure Replacement	11-Park-003	n/a	65,000	125,000	120,000	45,000		355,000
Forestry Implementation Plan	11-Park-004	n/a	5,000	5,000	5,000			15,000
Development of TCAAP Park Facilities	17-Park-001	3		2,500,000	2,500,000	2,000,000		7,000,000
Hard Court Reconstruction	18-Park-001	3	100,000	50,000	55,000	60,000		265,000
Parks Department Total			170,000	2,680,000	2,680,000	2,105,000		7,635,000
Public Safety								
LJFD Station Capital	09-Pub-001	n/a	6,954	15,860	9,272			32,086
LJFD Engine/Ladder Replacement	17-Pub-001	n/a	172,020	15,128				187,148
LJFD Rescue/Chief/Utility Vehicle Replacement	17-Pub-002	n/a	19,520		45,140	50,752	24,400	139,812
LJFD Radio Replacement	17-Pub-003	n/a	16,348	16,348				32,696
LJFD Other Capital Equipment	17-Pub-004	n/a	5,221	1,854	1,098			8,173
County Emergency Siren Replacement	17-Pub-005	n/a	28,000					28,000
Public Safety Total			248,063	49,190	55,510	50,752	24,400	427,915
Sanitary Sewer Department								
Sewer Lining/Rehabilitation	09-Sew-002	3	400,000		400,000		400,000	1,200,000
Reconstruct Lift Stations 11	10-Sew-003	3	10,000					10,000
TCAAP Trunk Sanitary Sewer & Lift Station	16-Sew-001	3	1,200,000					1,200,000
Sanitary Sewer Department Total			1,610,000		400,000		400,000	2,410,000
Street Department								
Hwy 96 and County Road F Sidewalk Improvement	14-Str-002	3	425,000					425,000
MnDOT Bridge Projects	15-Str-061	3	100,000					100,000
Hwy 96 Landscaping	17-Str-003	4	300,000					300,000
Old Snelling Ave including Bridge Reconstruction	17-Str-004	3			1,750,000			1,750,000
CR E Sidewalk and Old Hwy 10 Trail (Bethel)	18-Str-003	3	400,000	1,000,000				1,400,000
Co Rd 96 Signal Maintenance	18-Str-004	2		6,000				6,000
Street Department Total			1,225,000	1,006,000	1,750,000			3,981,000
Surface Water Management Dept								
Storm Pond Maintenance	09-Storm-001	3	50,000	0	50,000			100,000

Department	Project#	Priority	2017	2018	2019	2020	2021	Total
Storm Water Inlet/Outlet Repairs	13-Storm-001	3	25,000	0	25,000			50,000
Storm Water BMP Study/Construction	17-Storm-001	3	125,000					125,000
Surface Water Management Dept Total			200,000	0	75,000			275,000
Technology								
Springbrook Software Upgrades	12-Tec-001	n/a	5,000	5,000	5,000	5,000	5,000	25,000
Technology and Office Equipment	12-Tec-002	n/a	5,000	5,000	5,000	5,000	5,000	25,000
Communications Equipment	12-Tec-003	n/a	2,000	2,000	2,000	2,000	2,000	10,000
Technology Total			12,000	12,000	12,000	12,000	12,000	60,000
Water Department								
Water Towers Repair and Repainting	12-W-001	3	900,000					900,000
Valve Replacement Program	13-W-001	3	30,000	35,000	35,000	35,000	35,000	170,000
Hydrant Replacement Program	15-W-001	3	40,000		40,000		40,000	120,000
TCAAP New Booster Station	16-W-001	3	1,000,000					1,000,000
TCAAP Trunk Water Improvements (Spine Road)	16-W-002	3	1,000,000					1,000,000
TCAAP Water Tower	16-W-003	3				4,800,000		4,800,000
CR E2 Water Replacement/Old Hwy 10 Water Loop	17-W-001	4	400,000					400,000
Water Department Total			3,370,000	35,000	75,000	4,835,000	75,000	8,390,000
GRAND TOTAL			6,930,063	3,782,190	5,072,510	7,002,752	536,400	23,323,915

Appendix 5
Emergency Telephone List

City of Arden Hills
Water Emergency Telephone List

Emergency Response Team	Name	Work Telephone	Alternate Telephone
Emergency Response Lead	Bill Joynes	651.792.7810	612.860.4950
Alternate Emergency Response Lead	Jeff Frid	651.792.7852	651.755.1461
Water Operator	Joe Mooney	651.755.0211	
Alternate Water Operator	Max Arvidson	651.755.0217	
Alternate Water Operator	Michael Christofore	651.755.0209	
Alternate Water Operator	Thomas Mikacevich	651.755.0221	
Alternate Water Operator	Mark Moser	651.755.0223	
Alternate Water Operator	Tony Nowlan	651.755.0229	
Alternate Water Operator	Darien Schifsky	651.755.0213	
Public Communications	William S. Joynes	651.792.7811	

State and Local Emergency Response Contacts	Name	Work Telephone	Alternate Telephone
State Incident Duty Officer	Minnesota Duty Officer	800.422.0798 Out State	651.649.5451 Metro
County Emergency Director	Judd Freed	651.266.1014	952.203.5919
National Guard	Minnesota Duty Officer	800.422.0798 Out State	651.649.5451 Metro
Mayor	David Grant	651.538.0747	
Fire Chief	Tim Boehlke	651.481.7024	911
Sheriff	Jack G. Serier	651.484.3366	911
Ambulance	Jeff Lanenberg	952.894.5492	911
Hospital	Regions	651.254.3456	
Hospital	St. Johns	651.232.7000	
Hospital	Unity	763.421.2222	

State and Local Agencies	Name	Work Telephone	Alternate Telephone
MDH District Engineer	Chad Kolstad	651.201.5000	651.201.3972
MDH	Drinking Water Protection	651.201.4700	
State Testing Laboratory	Minnesota Duty Officer	800.422.0798 Out State	651.649.5451 Metro
MPCA		651.296.8100	
DNR Area Hydrologist	Kate Drewry	651.259.5753	
St. Paul Regional Water Utility	Steve Schneider	651.266.6274	651.266.6868

Utilities	Name	Work Telephone	Alternate Telephone
Electric Company	Xcel Energy	800.895.1999	
Gas Company	Xcel Energy	800.895.2999	
Telephone Company	Qwest	800.954.1211	
Gopher State One Call	Utility Locations	800.252.1166	651.454.0002
Highway Department	MnDOT	651.779.1168	

Mutual Aid Agreements	Name	Work Telephone	Alternate Telephone
Neighboring Water System	Mark Maloney – City of Shoreview	651.490.4650	
Neighboring Water System	Scott Boller - City of New Brighton	651.638.2119	
Emergency Water Connection	Marc Culver – City of Roseville	651.792.7196	
Materials			

Technical/Contracted Services/Supplies	Name	Work Telephone	Alternate Telephone

MRWA Technical Services	MN Rural Water Association	800.367.6792	
Pump Repair	Pete Rearden - Electric Pump	952.758.7778	952.220.1611
Electrician	Peoples Electric	651.227.7711	
Excavation/Repair	Mike Frost – Nova Frost	612.919.7177	
Excavation/Repair	Scott Coffin – Valley-Rich Co.	952.448.3002	612.839.8504
Meter Repair	Robin Boros – Midwest Meter Repair	763.561.7681	612.799.4348
Security Alarm	Johnson Controls	800.753.4524	
Pipe & Fittings/Valves	Ferguson	763.560.5200	
Leak Detection	Tony – Water Conservation	612.600.8716	
Tree Removal	Precision	651.484.2726	
MRWA Technical Services	MN Rural Wa. Association	800.367.6792	
Insurance	Mark Lenz – Bearance	651.379.7843	
Insurance	Phil Trebattoski – LMCIT	651.215.4060	651.357.5699
Engineering	Sue Polka – City of Arden Hills	651.792.7846	651.612.1175
Engineering firm	WSB & Associates – Andy Broztler	763.287.7191	612.360.1291

Communications	Name	Work Telephone	Alternate Telephone
News Paper			
Radio Station	MPR	651.290.1500	
School Superintendent	Chris Lennox	651.621.6000	

Critical Water Users	Name	Work Telephone	Alternate Telephone
Bethel College	Bruce Kunkel	651.638.6999	651.638.6259
Boston Scientific		651.582.6295	651.895.0548
Land O Lakes	Kevin Taaffe	651.481.2087	612.685.8218
Moundview High School		651.633.4031	
Valentine Elementary School		651.631.0737	
Presbyterian Homes	Wayne Hardison	651.636.5042	651.238.2555

Appendix 6

Cooperative Agreements for Emergency Services

CONTRACT FOR WATER SERVICES
Between the
CITY OF ROSEVILLE
and the
CITY OF ARDEN HILLS

This **CONTRACT**, made and entered into this 14th day of August 2006, is entered into by and between the **CITY OF ROSEVILLE** (“Roseville”), a municipal corporation under the laws of the State of Minnesota, and the **CITY OF ARDEN HILLS** (“Arden Hills”), a municipal corporation under the laws of the State of Minnesota.

WITNESSETH:

WHEREAS, it is the intention of the parties that Roseville shall sell water to Arden Hills; and

WHEREAS, Roseville is a party to a certain contract for water services with the Board of Water Commissioners of the City of St. Paul (“St. Paul”), a copy of said contract is attached as Exhibit “A”, and made a part hereof by reference; and

WHEREAS, Roseville has been providing water to Arden Hills continuously since 1963; and

WHEREAS, Roseville and Arden Hills desire to continue this relationship.

NOW, THEREFORE be it agreed by and between the parties hereto:

SECTION I **Period of Contract**

- A) This Agreement shall remain in full force and effect until December 31, 2024, unless terminated earlier pursuant to Section II of this contract. The date of commencement of this contract shall be on the day that it is finally approved by Roseville, Arden Hills and St. Paul, as required under the terms of the contract between Roseville and St. Paul, a copy of which is attached.

SECTION II **Termination**

- A) Roseville shall have the right to terminate this contract in the event Arden Hills fails to pay charges to which Roseville is entitled under this contract; Roseville gives written notice to Arden Hills setting forth the default; and Arden Hills, within sixty days, fails to redeem or demand arbitration pursuant to Section XI if the amount is disputed.
- B) Either party shall have the right to terminate this contract upon the occurrence of any of the following events:
 - 1) If federal or state laws are enacted which substantially and adversely affect rights, duties or obligations of either party under this contract, but in the cancellation for such cause either party shall give the other party at least one year’s written notice of cancellation, unless the giving of such notice by a party is prevented by the superior law referred to herein.

- 2) One party fails to comply with any obligation of this contract and the other party gives written notice setting forth the default; the defaulting party fails, within ninety days, to correct the default or demand arbitration pursuant to Section XI, if the default is disputed.
- 3) Either party fails to comply with an award pursuant to Section XI.
- 4) If the aforesaid contract, marked Exhibit "A" is terminated by either St. Paul or Roseville and in such event, a party seeking termination to the contract agrees to transmit to the other, any and all notices pertaining to such proposed termination.

C) The right to terminate by either party shall not be an exclusive remedy and either party retains all remedies regardless of its decision to terminate.

SECTION III Water Service

- A) Roseville agrees to furnish and deliver to Arden Hills its water requirement on a demand basis. Demand basis is defined as a continuous supply of water for 24 hours a day at the Roseville line pressure. Arden Hills shall provide supplemental pumpage to meet pressure requirements for the Arden Hills system.
- B) Roseville agrees to supply Arden Hills with the water which shall be the same treated water supplied by St. Paul, and Roseville undertakes no responsibility for the quality of said water other than transmitting it to Arden Hills with reasonable care to prevent contamination and pollution.
- C) Roseville's obligation to supply water on a demand basis is qualified by the requirement that Arden Hills maintain peak hour storage with the necessary regulatory apparatus to permit each city to temporarily operate off the other's water tower during periods when one tower is out of service for painting, repairing, or similar reasons. Arden Hills shall maintain the construction requirement herein by submitting to Roseville any plans for modifications of the pump control system within Arden Hills which can be used to operate Roseville's booster pump control system. Such plans and specifications shall be deemed approved by Roseville unless written objection hereto is made by Roseville within 20 days after receipt of the same.
- D) During such periods that the meters measuring water flow to and from Arden Hills are inoperable or out of service for repair, the volume of water for which Arden Hills must pay Roseville shall be determined from an equal period just preceding and just following the temporary period.

SECTION IV Financial Obligation of Arden Hills

- A) Arden Hills agrees to indemnify Roseville for all costs Roseville is obligated to pay for increasing the capacity of supply lines resulting from Arden Hills' needs.
- B) Arden Hills shall have the same option payment plan to pay Roseville that Roseville has to pay St. Paul according to the attached exhibit A. Roseville agrees to use its best efforts to notify Arden Hills of all communications it receives from the City of St. Paul bearing upon this financial obligation.

SECTION V Service by Roseville to Other Municipalities

- A) Roseville agrees it will not sell water to any municipality until the other municipality agrees as follows: In the event Roseville is required to increase water capacity as provided in Section IV and the water requirement of Roseville and Arden Hills at all pertinent times is less than 28 million gallons per day, then the new municipality shall have the same obligation of indemnification of Roseville as is assumed by Arden Hills in Section IV hereof, which obligation of the new municipality shall be a primary obligation as between Arden Hills and the new municipality, and the new municipality shall indemnify Arden Hills against any cost or claim, including attorney's fees, incurred by Arden Hills under said Section IV.
- B) In the event Roseville is required to increase water capacity pursuant to Section IV hereof under circumstances other than as set forth in the preceding paragraph, then the cost assumed by Arden Hills and the new municipality shall be on the basis of peak potential usage of water by Arden Hills and the new municipality.

SECTION VI Water Rates and Time of Payment

- A) Roseville shall, monthly or quarterly, at its option, submit a statement of charges to Arden Hills. Arden Hills shall pay same within thirty days of receipt.
- B) Roseville shall determine the amount of the statement by adding the following items only:
 - 1) The average cost per 100 cubic feet or per 1,000 gallons of water per month charged to Roseville by St. Paul.
 - 2) All additional costs incurred by Roseville for the administration of this contract or transmitting water to Arden Hills, including but not limited to, costs of reading and maintaining meters, cost of billing Arden Hills any legal or engineering cost in administering or enforcing this contract. Such costs shall be detailed and submitted along with an invoice. Notwithstanding the foregoing, Arden Hills shall not be required to pay for any legal or engineering expenses incurred by Roseville in litigation or arbitration or judicial determination in favor of Arden Hills, nor shall Arden Hills be billed for legal or engineering costs incurred by Roseville insofar as they related to differences between Roseville and St. Paul or between Roseville and any third municipality receiving water from Roseville.

- 3) The costs of maintaining and depreciation on jointly used pumping and control equipment, the apportionment of such costs to be calculated on the use basis.
- 4) Costs as set forth in Section IX
- 5) Arden Hills shall pay Roseville \$55.00 per year for each fire hydrant in Arden Hills on an unmetered supply.

SECTION VII Meter Reading and Billing

- A) Monthly reading of the master meter or meters at the point or points of delivery to Arden Hills shall be made by Roseville on the last working day of the month.
- B) Arden Hills shall supply a master meter at each point of connection other than covered in Section IX of this contract. These master meters shall be of a size, type, and design approved by Roseville. Roseville will undertake all reading and maintenance of these meters. Costs therefore shall be borne by Arden Hills as provided by Section VI.

SECTION VIII Capital Costs

- A) All additional capital costs incurred in Roseville or Arden Hills by reason of service to Arden Hills shall be borne by Arden Hills. Any capital costs which will benefit both Arden Hills and Roseville shall be shared on a basis determined by the proportionate design capacity available to each municipality.

SECTION IX Arden Hills Water System Which is not Subject to the Master Meters

- A) It is anticipated that some residents of Arden Hills will receive water service directly from Roseville without going through the master meters of Arden Hills. Each of these customers shall have a meter supplied by Arden Hills and said meter shall be maintained and read by Roseville personnel.
- B) Roseville shall then calculate the water usage of each customer and add this amount to that on the master meters.
- C) All costs of maintaining, installing, and reading of these meters shall be paid by Arden Hills to Roseville and added to the bills rendered to Arden Hills pursuant to Section VI.
- D) Arden Hills shall not draw water out of any fire hydrants in Arden Hills which hydrants are on that part of the Arden Hills water system which does not go through the master meter of Arden Hills except on the following basis:
 - 1) For fire fighting purposes
 - 2) For flushing the Arden Hills water system
 - 3) Until permission is obtained from Roseville and Roseville shall grant permission only when the water draw-off is metered

SECTION X **Regulations**

- A) It is agreed by and between the parties that Exhibit "A" contains a series of regulations which are required to be imposed upon Arden Hills pursuant to this contract. Arden Hills also agrees to be bound by all those regulations as set forth in Exhibit "A".
- B) Arden Hills agrees to do no act which will jeopardize Roseville's contractual relationship with St. Paul and to take all reasonable affirmative acts to protect Roseville's contractual rights with St. Paul.
- C) Arden Hills agrees to adopt any reasonable ordinance requested by Roseville to protect the water facilities and water in Arden Hills.
- D) Arden Hills will not sell any water to any other municipality without first receiving permission from Roseville.

SECTION XI **Arbitration**

- A) In the event there is any dispute by the parties over the terms of this contract, both agree to be bound by arbitration, pursuant to Minnesota Statute, Chapter 572, and any subsequent amendments.

SECTION XII **Force Majeure**

- A) Neither party shall be held responsible for performance of this Agreement if the party's performance is prevented by acts or events beyond the party's reasonable control including, but not limited to: several weather and storms, earthquakes, tornados or other natural occurrences, strikes and other labor unrest, power failures, electrical power surges or current fluctuations, nuclear or other civil or military emergencies, or acts of legislative, judicial, executive or administrative authorities.

SECTION XIII **Interruption in Service**

- A) Arden Hills acknowledges that water service can be interrupted due to, among other things, main breaks, equipment failures, weather conditions, maintenance, repairs or improvements. Therefore, Roseville cannot guarantee that there will be no interruptions in service, or that any specific pressures or fluctuations in pressure will or will not occur. Arden Hills agrees that Roseville shall not be liable or responsible for any losses or damages, consequential or otherwise, resulting from any such interruptions in service or fluctuations in pressure.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed on the dates listed below.

CITY OF ARDEN HILLS

CITY OF ROSEVILLE

Beverly Aplikowski
Beverly Aplikowski
Mayor

Craig Klausning
Craig Klausning
Mayor

Michelle Wolfe
Michelle Wolfe
City Administrator

Christopher K. Miller
Christopher K. Miller
Interim City Manager

8/1/06
Date

8/14/06
Date

Schawn, Jim, and Michelle:

Attached is a photocopy of the signed agreement with the City of Roseville for Water Services. The agreement is a twenty year agreement. Pang is going to put the signed original in the "contracts" file for this year. But since it is a twenty year contract the 2006 file might get boxed away at some time. So, I wanted you all to be aware of where we were putting the original -- and ask that you put this note with your copy of the contract in whatever personal file you are putting it in, so there is a reference for all of our future replacements. Thanks!

M. Wolfe
8/28/06

Handwritten notes:
Schawn - New version
Michelle - New version
Jim - New version
8/28



August 24, 2006

Ms. Michelle Wolfe
City Administrator
City of Arden Hills
1245 West Highway 96
Arden Hills, Minnesota 55112

Dear Ms. Wolfe:

The Roseville City Council, at their meeting of August 14th, 2006, approved the Contract for Water Services between the City of Roseville and the City of Arden Hills. Enclosed is your fully executed copy.

If you have any questions, feel free to contact me at 651-792-7023.

Very truly yours,

A handwritten signature in cursive script that reads "Margaret Driscoll".

Margaret Driscoll
Administrative Assistant

enc

Appendix 7

Municipal Critical Water Deficiency Ordinance

Chapter 10 - Utilities

Section 1000 - Water

1000.01 General Operation and Administration.

Subd. 1 Public Utility. The City water system, hereinafter called "the water system," shall be operated as a public utility and convenience from which revenue will be derived, subject to the provisions of this section.

Subd. 2 General Administration. The general administration of the water system shall be under the direction and control of the City Administrator, who shall report to the Council upon request of the Council. The City Administrator is hereinafter referred to as the Administrator. He or she shall be authorized to appoint representatives, either salaried or nonsalaried, to discharge the duties provided by this section and such other responsibilities as may arise in administration of the water system. The City Administrator shall be promptly and fully advised as to the appointment of the representatives.

Subd. 3 Records. The City Administrator shall be responsible for the keeping of records relating to the water system, including records of permits and finances in connection therewith.

Subd. 4 Engineer. The City Engineer shall perform the duties provided for him or her in this section and shall provide additional consultation and advice as the City Administrator shall request from time to time.

Subd. 5 Private Wells. References in this section to the water system shall not be deemed to apply to privately owned wells unless the language used specifically requires such application.

1000.02 Use of Water Restricted to Authorized Persons.

No person shall make, construct or install any water service installation or make use of any water service which is connected to the water system except in the manner provided in this section.

1000.03 Willful Damage to Water System.

No person shall remove, alter, damage or trespass upon any structure, appurtenance or property of the water system, or cause water to be consumed, diverted, restricted, wasted or contaminated in any manner unless permitted pursuant to written authorization or a permit from the City.

1000.04 Discontinuance of Service for Violations.

Subd. 1 General. Subject to the provisions of this subsection, water service may be shut off at any stop box connection whenever:

A. The owner or occupant of the premises served, or any other person working on any pipes or equipment thereon connected with the water system, has violated or threatens to violate any of the provisions of this section.

B. Any charge for water, service meter, or any other financial obligations imposed on the present or former owner or occupant of premises served by the connection are unpaid.

C. Fraud or misrepresentation by the owner or occupant of the premises served in connection with the application for service.

D. The property is unsecured and/or vacant.

Subd. 2 Notice.

A. Water shall not be shut off under Subd. 1 above until notice and an opportunity for a hearing shall have first been given to the owner and/or occupant (the "customer") of the premises involved. The notice shall be personally served in the same manner as summonses in civil actions and shall state that if payment, proof of payment or proof of no violation of Subd. 1 above have not been made before a date specified in the notice, but not less than thirty (30) days after the date on which the notice has been given, the water supply to the premises shall be shut off.

B. The notice shall clearly inform the customer of the available opportunities to present to the City his or her objections to the bill or the violation claimed in the notice and shall identify the telephone number, address and officer or employee of the City who will receive the customer's payment and/or review the customer's facts and files and has authority to decide whether payment has in fact been made or a violation has not occurred, to correct any errors in billing and to arrange for credit terms. The notice shall also state that the customer may, before the date, demand in writing (which shall contain the customer's return address) a hearing on the matter.

C. If the property is unsecured and/or vacant, then Subd. 2 A and B above shall not apply and the City may shut off the water to protect the safety of the premise or property. A good faith effort will be made by the City to notify the owner prior to the water being shut off.

Subd. 3 Restriction on Shut-off. If, by the date specified in the notice, the City has received the customer's demand for a hearing, then the City shall not shut off the customer's water supply until after the hearing has been held, and the panel required by this subsection has determined that the water supply should be discontinued. If the customer has paid to the City his or her delinquencies, plus the cost of serving the aforesaid notice upon him or her, or has furnished the City with proof of the payment satisfactory to the officer specified in the notice, or has cured any nonmonetary violations to the satisfaction of the officer by the date specified in the notice, then the City shall not shut off the customer's water supply.

Subd. 4 Hearing.

A. If the customer demands a hearing in writing, the demand must be received by the City before the date specified in the notice provided in Subd. 2 and must specify the customer's return address or post office address for purposes of the notice of hearing. The City Administrator shall bring it to the City Council. The notice of hearing shall specify the date, time and place of the hearing and the purpose thereof. It shall be sent by certified or registered mail, return receipt requested. The date it is deposited in the U.S. mail system is the date that it shall be deemed to have been given.

B. If, as a result of the hearing, the City Council finds that the amount claimed to be owed is actually due or that the customer has committed one (1) of the nonmonetary violations described in Subd. 1 above, and that there is no legal reason why the water supply of the delinquent customer may not be shut off in accordance with this section, then the City shall be authorized to shut off the supply. Where the violation is a nonmonetary one, the panel shall specify the cure for the violation, if any, and give the customer a reasonable opportunity to effect the cure before authorizing the City to disconnect the water supply.

Subd. 5 Cold Weather Rule. Where a customer's water service is essential to his or her primary heating service, water shall not be shut off between October 15 of any year and the following April 15 except in accordance with the Minnesota Cold Weather Rule found in M.S. § 216B.097, as amended from time to time.

Subd. 6 Restoration of Service. When water service to any premises has been discontinued, service shall not be restored except upon payment of all delinquent amounts due, or correction of the nonmonetary violation of Subd. 1 hereof to the satisfaction of the City Administrator, plus the costs for serving the notices required herein above and plus a fee for disconnection and reconnection in the amounts as are from time to time established by resolution of the Council.

1000.05 Deficiency and Temporary Shut-off Water.

The City shall not be liable for any deficiency or failure in the supply of water to consumers, whether occasioned by shutting the water off for the purpose of making repairs or connections, or from any other cause whatever. In case of fire, or alarm of fire, or in making repairs or construction of new works, water may be shut off at any time and kept shut off as long as necessary.

1000.06 Supply from One Service.

No more than one housing unit or building shall be supplied from one service connection except by special permission of the City Administrator. Whenever two (2) or more housing units or buildings are supplied from one pipe connecting to a distribution main each building or part of building shall have a separate stop box and a separate meter.

1000.07 Tapping of Mains Prohibited.

No person except those duly authorized by the City shall tap any distributing main or pipe of the water supply system, or insert stop cocks or ferrules in any such pipe.

1000.08 Repair of Leaks.

It shall be the responsibility of the consumer or owner to maintain the service pipe from the curb box into the house or building. In case of failure upon the part of any consumer or owner to repair any leak occurring in his or her pipe within twenty four (24) hours after verbal or written notice thereof, the water shall be shut off and shall not be turned on until the sum listed in the fee schedule appendix to this code has been paid and the leak repaired. When the waste of water is great, or when damage is likely to result from the leak, the water may be turned off immediately pending repairs.

1000.09 Abandoned Services.

Subd. 1 Disconnection. All service installations that have been abandoned or have not been used for three (3) years shall be disconnected at the main by the City. All pipe and appurtenances removed from such connections shall be the property of the City and any expense of the City in connection with the disconnection shall be charged to the property.

Subd. 2 New Buildings. When new buildings are erected on the site of abandoned services, and it is desired to increase or change the old water service, no connections with the mains shall be made until all the old service shall have been removed and the main connection plugged by the property owner. City inspection of the plug will be required. The City Administrator shall have the power, in his or her discretion, to permit continuance of the old service until the new service is connected to the property, when immediate removal of the old service would constitute a hardship

1000.10 Service Pipes.

Every service pipe shall be laid in such manner as to allow not less than one foot of extra length and in such manner as to prevent rupture by settlement or otherwise. The service pipe shall be placed no less than seven (7) feet below the surface and in all cases so arranged as to prevent rupture by freezing. Joints in service pipe or tubing shall be kept to a minimum, with no slice or coupling allowed in service lines less than one hundred (100) feet in length on one-inch lines. Large diameter service lines may be spliced as necessary according to available manufactured lengths.

1000.11 Use Confined to Premises.

No person shall permit water from the water system to be used for any purpose except upon his or her own premises unless written consent is obtained from the City Administrator.

1000.12 Connections at or Beyond City Limits.

Where water mains of the City or an adjacent municipality are in any street or alley adjacent to or outside the corporate limits of the City, the City Administrator may issue permits to the owners or occupants of properties at or beyond the City limits and accessible to the water mains to make water service pipe connections with the mains and to be supplied with water from the mains in accordance with the applicable provisions of this section and all pertinent and applicable contract provisions.

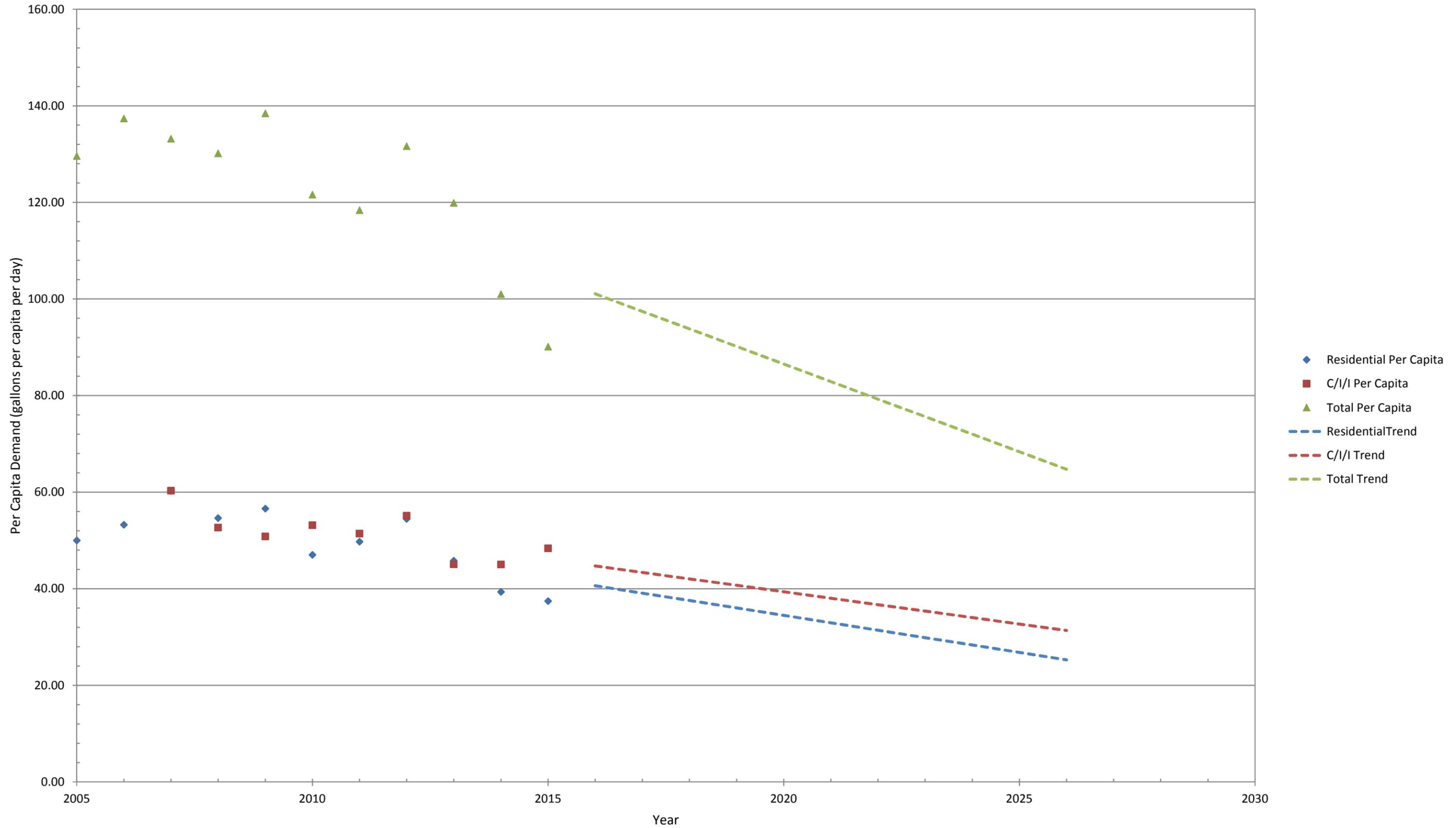
1000.13 Restrictions and Limitations of Water Use.

All water customers shall be subject to applicable regulations of the City or other regulations to which the City is subject by contract relating to limitations in the time and manner of using water or relating to the preservation, regulation and protection of the water supply.

Appendix 8

Graph Showing Historical and Projected Annual Water Demand for
Each Customer Category

City of Arden Hill's Historical and Projected Water Use by Customer Category



Appendix 9
Water Rate Structure

2016 WATER AND SEWER UTILITY RATES

(Effective January 1, 2016)

Water Per Quarter:

Meter Charge	3/4" Meter Size or Smaller	\$23.88
Meter Charge	1" Meter Size	\$57.69
Meter Charge	1.5" Meter Size	\$122.02
Meter Charge	2" Meter Size	\$196.58
Meter Charge	3" Meter Size	\$427.89
Meter Charge	4" Meter Size	\$641.43
Meter Charge	6" Meter Size	\$1,068.45
Meter Charge	8" Meter Size	\$2,153.91
Meter Charge	10" Meter Size	\$3,061.33
Meter Charge	12" Meter Size	\$4,342.49
Consumption: 1-10,000 gals.	per 1,000 gallons (pro-rated)	\$2.65
Consumption: 10,001-35,000 gals.	per 1,000 gallons (pro-rated)	\$3.45
Consumption: Over 35,000 gals.	per 1,000 gallons (pro-rated)	\$6.10
Water Test	Fee set by MN State Health Dept	\$1.59

Sanitary Sewer Per Quarter:

Base Charge – Single Family	per lot	\$90.79
Base Charge – Multiple Family	per dwelling	\$90.79
Usage Over 15,000 gals. – Single Family/Multiple Family	per 1,000 gallons (pro-rated)	\$5.23
Sanitary Sewer – Commercial Apartment/Condominium	per 1,000 gallons (pro-rated)	\$5.66
Sanitary Sewer - Mobile Home	per unit	\$98.20

Surface Water Per Quarter:

Residential - Single Family	per lot	\$14.29
Residential – Multiple Family	per dwelling	\$18.52
Apartment / Condominium	per acre	\$116.61
Industrial / Commercial	per acre	\$182.06
Undeveloped	per acre	\$21.42

Standby Per Quarter:

Standby	1" Service Line or smaller	\$8.16
Standby	1.25" Service Line	\$11.78
Standby	1.5" Service Line	\$16.24
Standby	2" Service Line	\$24.81
Standby	3" Service Line	\$55.97
Standby	4" Service Line	\$99.81
Standby	6" Service Line	\$223.80
Standby	8" Service Line	\$398.29
Standby	10" Service Line	\$623.02
Standby	12" Service Line	\$895.40
Standby	Shared 6.95	\$26.68

Appendix 10

Adopted or Proposed Regulations to Reduce Demand or Improve Water Efficiency

Regulations to Reduce Demand or Improve Water Efficiency

Arden Hills City Code, Chapter 10 – Utilities (<http://www.cityofardenhills.org/Index.aspx?NID=136>)

1000.13 Restrictions and Limitations of Water Use.

All water customers shall be subject to applicable regulations of the City or other regulations to which the City is subject by contract relating to limitations in the time and manner of using water or relating to the preservation, regulation and protection of the water supply.

1000.16 Use of Water for Air Conditioning.

All air conditioning systems which are connected directly or indirectly with the public water system shall be equipped with water conserving and water regulating devices as approved by the City Administrator.

Appendix 11
Implementation Checklist



City of Arden Hills Implementation Checklist

Action	Description	Timeframe				
		ongoing	annually	1-3 yrs	1-5 yrs	3-6 yrs
Review city ordinances/codes	To encourage or require water efficient landscaping.			✓		
Review city ordinance/codes	To permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use.		✓			
Revise ordinances to limit irrigation	Review outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements					✓
Make water system infrastructure improvements		✓				
Provide rebates or incentives for installing water efficient appliances and/or fixtures	e.g. low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet	✓				
Conduct audience-appropriate water conservation education and outreach		✓				
Conduct a facility water use audit	For both indoor and outdoor use, including system components		✓			
Install enhanced meters	Capable of automated readings to detect spikes in consumption	✓				
Install water conservation fixtures and appliances or change processes to conserve water	Toilets, faucets, etc.	✓				
Repair leaking system components	(e.g., pipes, valves)	✓				
Investigate the reuse of reclaimed water	(e.g., stormwater, wastewater effluent, process wastewater, etc.)	✓				
Reduce outdoor water use	(e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	✓				
Train employees how to conserve water	Include for new employee training	✓				
Increasing block rates billing strategy	Rate structure for Residential, Commercial, Industrial, and Institutional customers	✓				
Consider participating in the GreenStep Cities Program	Voluntary program to aid cities in achieving their sustainability and quality-of-life goals			✓		

Water Conservation Outreach	Implement a water conservation outreach program			✓		
Consumer Confidence Reports	Report of City's water quality		✓			
Community education	Press releases to traditional local news outlets; Arden Notes newsletters; information kiosks at utility and public buildings; website	✓				
RCWD Stormwater Reuse Workshop	Rice Creek Watershed District workshop to educate on stormwater reuse		✓			